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The miracles of science™

DuPont™ Vespel®
parts & shapes> [Science of Vespel®](#)

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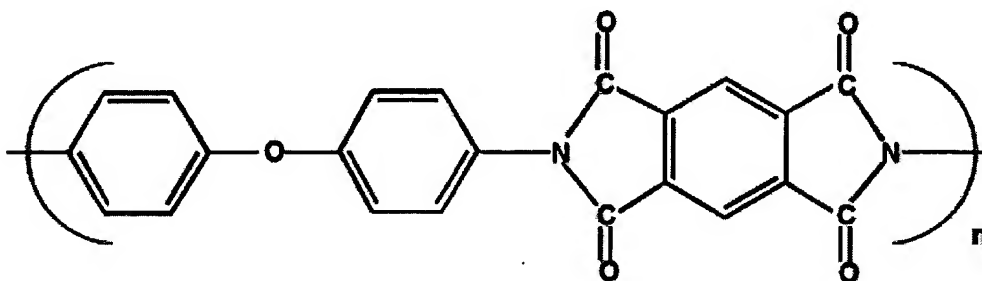
Science of Vespel®

The Vespel® business is dedicated to providing products for applications with conditions that are too severe for most organic polymers to perform well. The majority of our products are based on a class of polymers called polyimides, which are rigid and thermally stable enough to allow them to perform well in such situations. In recent years, the Vespel® product family has expanded to include materials based on other polymer classes in order to meet the increasingly complex challenges of today's marketplace.

The Vespel® organization has developed a number of products to satisfy the specific requirements of customers. Using approaches such as polymer chemistry, the use of appropriate additives, and unique processing capabilities, properties such as wear resistance, thermal resistance, low coefficient of friction, creep resistance, self-lubrication, chemical resistance, and low outgassing can be achieved. The broad technical knowledge and resources available within the DuPont Company provide a distinct advantage in developing the appropriate Vespel® materials to satisfy the application requirements.

Polyimides

Polyimides have been a key class of polymers for DuPont since the 1960's, when Kapton® film and Vespel® parts and shapes were first commercialized. The chemical structure of a typical polyimide is shown in the diagram below. Such a polyimide is called an "aromatic polyimide", as all of the carbons in the polymer chain are part of either the imide or the benzene (aromatic) rings. This arrangement leads to a higher glass transition temperature (if one can be detected) and greater thermal and oxidative stability than the majority of organic polymers.



Based on the selection of the starting materials (monomers), the additives used, and methods of processing, the properties of polyimides can be tailored. Over the years, these tools have been used to expand the Vespel® product portfolio from a single polyimide to include a variety of polyimide materials with differing sets of properties. More recently, the Vespel® product family has expanded even further to include several other polymer types to meet the increasingly rigorous needs of the marketplace.

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